California Black Walnut tree. It deserves to be preserved. The applicant has no special right to violate the above-mentioned sections of the Berkeley Zoning Ordinance. Is Pacifica/KPFA above the law?

PARKING AND TRAFFIC PROBLEMS:

The parking variance should not be granted as the neighborhood has already been horribly impacted by the Golden Bear office building. The Golden Bear project has resulted in over 350 cars that used to park at the former Fred's Market parking lot now driving through the neighborhood. The establishment of a medical center at Berkeley Way and Bonita Avenue has also increased the traffic congestion in the neighborhood. The density of people and cars has increased greatly, as has the exhaust/pollution from all the cars driving back and forth looking for a parking place. The 2-hour E zone program has been a total failure as a protection of residents' ability to park on their own street. The local merchants, their employees come out of their business every 2 hours to rotate the wheels of their cars and trade parking spaces so as to avoid being ticketed. People who live in the neighborhood have to carry their babies, groceries, and belongings long distances because they are unable to find parking near their homes.

The neighborhood cannot absorb any more cars. Yet, KPFA-FM has over 300 staff members, most of whom will inevitably be driving their cars to work and look for parking spaces in the neighborhood.

The Zoning Ordinance states that variances are to be granted only when they are needed to avoid "unnecessary hardships." The applicant's property already contains substantial development and successful businesses. The property owner is already enjoying substantial property rights. Thus if the applicant desires this new building as well, it should have to provide the necessary parking spaces as required by the Zoning Ordinance and should have to observe the 20 feet parking setback from the street frontage as required by the Zoning Ordinance. And, KPFA/KPFB already have a home nearby in downtown building. So, this project is not necessary for the survival of the radio station. Staff and the Board of Adjustments have seriously compromised the Zoning Ordinance by treating variances as no different from use permits.

ENVIRONMENTAL DANGERS OF THE PLANNED 70 FEET HIGH RADIO TOWER:

The applicant plans to construct a 70 feet high radio tower /antenna on top of their new project. This tower would emit microwave radiation.

Prior to the Board of Adjustments meeting at which the project was approved, I handed out a 25-page comprehensive report - recommended to me by the state health department - written by Paul Broeder, a specialist in the field of power/microwave/VCR health hazards and author of Currents of Death. Unfortunately, City staff and Board of Adjustments members apparently did not take the time to read it. Mr. Broeder's report is attached to this appeal. At the Board's hearing on the project, I spoke about the health hazards of microwave radiation, including low-level microwave radiation. This radiation is widely believed to cause the following medical problems:

*Alteration of brain function and brain wave activity
*Changes in calcium outflow in the cerebral cortex
*Changes in the ability of parathyroid hormones to trigger enzymes which play a crucial role in the formation of new bone
*Suppression of T lymphocytes and the immune system
*A 4 times increase in the chances of developing thyroid tumors
*Expedited growth of existing tumors.
*Disturbances and changes in circadian rhythm and sleep patterns

Children are especially susceptible to power and microwave radiation, and develop cancer when exposed, twice as often as those not exposed. Increased miscarriages, deformities and low birth weight are also seen in those similarly exposed. 60 hertz magnetic fields are capable of producing significant changes in cellular structural function. It can inhibit the brain's pineal gland from producing melatonin, which inhibits tumor growth. And the list of consequences goes on and on. Of interest is the finding that low levels of microwave radiation are no less health damaging than the higher levels.

THE NEED FOR AN ENVIRONMENTAL IMPACT REPORT (EIR):

Clearly, an EIR is needed to study and reveal the serious impacts and health consequences and cost of live that would result from the construction and operation of this tower. CEQA requires an EIR when a fair argument can be made that the proposed project might produce significant environmental effects. The Initial Study prepared by City staff for this project is seriously flawed in that it ignores the substantial evidence that exists concerning the health hazards of microwave radio towers/antennas. The applicant and the staff report also fail to reveal what the separate impacts of broadcasting the KPFB signal would be. An EIR is needed to identify more reasonable alternatives to the construction of this tower. City staff is also faulted for not including the Initial Study in the Public Hearing Notice.

Dr. Roy Neutra, an industrial hygienist with the California Department of Health Services told me of the need for a careful study of the microwave/power emission plans proposed by

Pacifica/KPFA & KPFB. He recommends that the Berkeley Health Department assemble the facts. He has offered as a state official/industrial hygiene specialist to review the findings and would then advise the city if there is likely to be a health hazard.

The Public Hearing Notice also failed to include the north, east, and south elevations/views of the proposed building. KPFA's representative falsely told me that the east elevation of the building would contain no windows. In fact, drawings and oral testimony at the public hearing revealed that the east elevation would have windows, which would invade the privacy of adjacent residences.

Another KPFA spokesperson refused to tell me what the power output and microwave output of the radio antenna would be. This information must be included in the official reports before any permits can be approved.

The patio that the applicant intends to install on top of the building would be a serious intrusion into my privacy and those of other neighbors, and would add to the noise impact of the project.

I urge the City Council to hold a public hearing on this issue. While KPFA is a valuable member of our community, they must not be allowed to violate our Zoning Ordinance and to pursue activities that can be harmful to our health and possibly even cost some of us our lives. If Pacifica/KPFA/KPFB claim to be progressive and innovative, then we must expect them to find safe alternative methods (such as underground fiber optics cable) to broadcast their signal.

Sincerely,

Laetitia (Tish) Pierson

Laetitia (Tish) Pierson
1910 Berkeley Way
Berkeley California 94704

HAMMETT & EDISON, INC.

CONSULTING ENGINEERS
RADIO AND TELEVISION

ROBERT L. HAMMETT, P.E.
EDWARD EDISON, P.E.
ROBERT P. SMITH
DANE E. ERICKSEN, P.E.
HARRISON J. KLEIN, P.E.
WILLIAM F. HAMMETT, P.E.
GERALD E. SPILLMAN, P.E.
FREDERICK L. SPAULDING
LEONARD G. FILOMEO, P.E.
GERHARD J. STRAUB

MAILING ADDRESS:
BOX 280068
SAN FRANCISCO, CA 94128-0068

SHIPPING ADDRESS:
1400 ROLLINS ROAD
BURLINGAME, CA 94010-2304

OFFICE: 415-342-5200
202-396-5200
TELECOPIER: 415-342-8462

April 24, 1990

BY FEDERAL EXPRESS

RLH	WEH	GES	GGS	JT
EE				MK
	HK	LF	EM	
File				

Ms. Patricia Scott
Station Manager
FM Stations KPFA and KPFB
2207 Shattuck Avenue
Berkeley, California 94704

Dear Ms. Scott:

As you requested, I have reviewed the April 2, 1990, appeal filed by Ms. Leatitia ("Tish") Pierson of 1910 Berkeley Way, Berkeley, with the City of Berkeley, contesting the March 12 decision by the Board of Adjustments granting Pacifica Foundation permission to construct new KPFA/KPFB studios at 1929 Martin Luther King, Jr. Way (Use Permit Number A1662, Variance Number 1304). These new studios would include relocating the KPFA Aural STL and the KPFB transmitter to the new address. Ms. Pierson claims that the negative declaration with respect to the California Environmental Quality Act ("CEQA") was inappropriate, and that an environmental impact report ("EIR") should be required.

Ms. Pierson's appeal makes 5 allegations regarding the KPFA/KPFB broadcasting facilities:

1. "The noise levels of the broadcast tower has (sic) <u>not</u> been addressed."

Ms. Pierson compares the proposed *70-foot* studio tower located in a relatively flat, low-elevation portion of Berkeley to the *977-foot* Sutro Television Tower located atop Mt. Sutro in San Francisco. Besides the obvious differences in location, height, and structure size, I very much dispute Ms. Pierson's claim that the Sutro Television Tower "has been found on windy days to generate more noise than a jack hammer." I discussed this allegation with Mr. Donald Lincoln, Director of Engineering for Sutro Tower, Inc. Mr. Lincoln did

acknowledge that wind noise was sometimes caused by wind vorticies occurring around the guy wires strengthening the antenna stacks on the sixth (platform) level of the Sutro Tower, but explained that this effect had been eliminated about ten years ago when the fiberglass guy wires were replaced with Kevlar guy wires. Mr. Lincoln explained that the fiberglass guys had a smooth surface, causing the wind vorticies to create a high frequency sound which could sometimes be heard at ground level. In contrast, the Kevlar guy wires have a rough finish, causing low-frequency wind vorticies which can no longer be heard in the surrounding neighborhood. Mr. Lincoln explained that even when the "Aoelean Harp" effect was caused by the original fiberglass guy wires, it was nowhere near the loudness of a jack hammer, and stated that any claim to that effect was ridiculous.

2. "KPFA refused to specify what their lighting plans are."

No lighting or painting of the 70-foot studio tower is proposed. FAA/FCC regulations only require lighting and painting of tower structures if the structure exceeds 200 feet above ground, or if the structure exceeds a 100:1 sloping plane extending up to 20,000 feet from a runway. Because the tower would be well under the 200-ft trigger, and because there are no runways within 7,000 feet of the proposed studio location (the horizontal distance at which the 100:1 slope would be triggered by a 70-foot tower), no tower lighting or painting will be proposed when the KPFA Aural STL and the KPFB applications are filed with the Federal Communications Commission and there is no reason to expect that any tower lighting requirements will be imposed.

3. KPFA has refused to disclose what the power output and microwave output of the radio antenna would be.

The power output of the KPFA Aural studio-to-transmitter link ("STL") will be approximately 7 watts. This is the same power level which the Aural STL transmitter is using at the current KPFA/KPFB studios at 2207 Shattuck Avenue, and the same transmitter power which the Aural STL has used for at least the last 13 years. A higher-gain antenna meeting anticipated FCC "Category A" antennas standards will be employed when the Aural STL is moved, resulting in an effective isotropic radiated power of approximately 850 watts in the main beam. For this configuration, the following power densities have been calculated:

Location	Power Density
Roof of KPFA/KPFB studio	0.45 $\mu W/cm^2$
Sidewalk next to studio	0.13 $\mu W/cm^2$
Roof of two-story apartment building 100 feet from studios	0.06 $\mu W/cm^2$
Roof of three-story apartment building one block (400 ft.) from studios	0.45 $\mu W/cm^2$
Golden Bear building (680 ft. from studios)	0.16 $\mu W/cm^2$

To put these exposures in perspective, the current FCC limit at the frequency which the Aural STL operates (950 MHz) is 3,166 $\mu W/cm^2$, and the USSR standard for this frequency is 10 $\mu W/cm^2$. Thus, the exposures resulting from the Aural STL would be less than 1/5000th of the FCC standard (ANSI C95.1-1982) and even less than 1/10th of the Russian standard.

4. Microwave radiation from the tower would be a health hazard.

As discussed above, the microwave radiation from the Aural STL station will be so low as to even meet the Russian microwave standard. There is simply no scientific basis to support a claim that microwave exposures of less than 10 *micro*watts/cm^2 pose a health hazard, even if one concedes that there may be *athermal* effects caused by non-ionizing radiation.

At your request, I have discussed this matter with Dr. Raymond R. Neutra, M.D., Chief, Special Epidemiological Studies Program, Department of Health Services, State of California, 2151 Berkeley Way, Berkeley, California 94704. Dr. Neutra has indicated to me that he is satisfied that there is no health threat regarding the *Aural STL microwave* station. However, Dr. Neutra did express concern regarding non-ionizing radiation levels from KPFB. Those issues are discussed in Item 5, below.

5. Radiation from KPFB was not addressed.

This is a puzzling accusation, as the radiation levels from FM Station KPFB were addressed in my "To Whom It May Concern" letter of March 12, 1990, copies of which I understand were provided both to the Board of Adjustments and to Ms. Pierson. I also addressed the KPFB exposure levels in my testimony before the Board on March 12.

Dr. Neutra has expressed his concern that, because of the current controversy in scientific circles regarding possible athermal effects from non-ionizing electromagnetic radiation, as opposed to only thermal effects (as recognized by the current ANSI C95.1-1982 Standard), exposures which meet the current ANSI limit of 1000 μW/cm^2 at VHF frequencies and even the proposed revised ANSI limit of 200 μW/cm^2, might ultimately prove to be too lax. Dr. Neutra indicated that he would be satisfied that there would be no detrimental effects if the radiation from KPFB could be shown to meet the far more restrictive Russian standard of 2.4 μW/cm^2 at VHF frequencies. Dr. Neutra indicated that he had visited the proposed site (1929 Martin Luther King, Jr. Way) and had noted the presence of a nearby two-story apartment and a three-story apartment about a block away. Dr. Neutra requested that any additional calculations of radio frequency power densities from KPFB include calculations for rooftop exposures at such apartments. We agreed that the two-story apartment would be modeled as being only 100 feet removed from the proposed KPFA/KPFB studios. I am assuming further a rooftop height of 25 feet above ground for the two-story apartment, 35 feet above ground for the three-story apartment, and a very conservative 400 feet horizontal distance for a city block.

The following calculations assume 570 watts effective radiated power for KPFB (horizontally polarized) with a center of radiation 65 feet above ground. A two-bay low radio frequency radiation ("RFR") antenna with half-wavelength interbay spacing is assumed. Such antennas restrict downward radiation more effectively than standard FM antennas with full (one wavelength) interbay spacing. Although the KPFB antenna will undoubtably have to be directional in the horizontal plane to comply with FCC allocation restraints, for the purpose of these calculations an antenna which is omnidirectional in the horizontal plane is conservatively assumed. The following power densities are predicted for KPFB, using the calculation methods recommended by the FCC in its bulletin OST65, "A Broadcaster's Guide to FCC Radiation Regulation Compliance", (November, 1985):

Location	Power Density
Roof of KPFA/KPFB studio	0.15 $\mu W/cm^2$
Sidewalk next to studio	0.04 $\mu W/cm^2$
Roof of two-story apartment building 100 feet from studios	10 $\mu W/cm^2$
Roof of three-story apartment building one block (400 ft.) from studios	1.3 $\mu W/cm^2$
Golden Bear Building (680 ft. from studios)	0.44 $\mu W/cm^2$

It should be noted that, except for the two-story rooftop model, all of the calculated power densities *are less than the 2.4 $\mu W/cm^2$ USSR standard.* Even the two-story apartment rooftop model is within 6 dB of the Russian standard, and *exceeds the FCC requirements by a factor of one hundred.* One must also ask how likely it would be for persons to be on the roof of a two-story apartment building. Persons inside the apartment building would have the benefit of shielding due to the building roof.

I discussed with Dr. Neutra yet another factor: all of the studies which I am aware of suggesting the existence of low-level, athermal radio frequency radiation effects have involved low frequency (below 100 Hertz) modulation windows and amplitude or pulse modulated signals. In contrast, the signals from KPFB are frequency modulated and are unlikely to contain significant modulation components below 100 Hertz. Dr. Neutra agreed that these were valid technical points, totally ignored in Mr. Brodeur's Currents of Death, cited by Ms. Pierson.

Ms. Pierson concludes that City of Berkeley staff and the members of the Board of Adjustments have apparently not read Currents of Death. In fairness, I wonder if Ms. Pierson has read the critique of Currents of Death in the April, 1990, issue of Scientific American? The book review is written by Mr. M. Granger Morgan, Professor of Engineering and Public Policy and of Electrical and Computer Engineering at Carnegie-Mellon University. Mr. Morgan's eight-page evaluation of Currents of Death closes with the following conclusion:

> "In simplifying a complex problem by sweeping all complexity under the rug of cover-up, and by failing to discuss the possibility that in the face of present evidence reasonable and honest people may reach very different conclusions, Paul Brodeur's *Currents of Death* has done a disservice to the public interest he presumes to champion."

I would further add my own critique: in Currents of Death Mr. Brodeur positively castigates the USAF for time-averaging power densities when measuring its PAVE PAWS radar (Currents of Death, at page 105). Because radars are pulsed systems, there is a big difference between radar peak power densities and average power densities. Yet Mr. Brodeur then turns around and castigates the Illinois Institute of Technology Research Institute ("IITRI"), other power utilities, and the FDA when they point out that magnetic fields given off by household appliances are generally much higher than "background" magnetic fields given off by high voltage and local distribution power lines. Mr. Brodeur now insists that these fields are inconsequential when *time averaged* and *spatially averaged* over the whole body (Currents of Death, at Pages 167, 180, 224, and 310). It would appear that Mr. Brodeur is

guilty of some of the same bias and inconsistency which he accuses numerous individuals and organizations which reach conclusions contrary to his of possessing.

In summary, I disagree with Ms. Pierson's claim that she has demonstrated that the radio frequency power density levels which would result from the KPFA Aural STL microwave station and FM Station KPFB warrant an EIR. At the March 12 hearing, one of the Board of Adjustments members observed that KPFB has been at the 2207 Shattuck Avenue address for over 30 years. He asked Ms. Pierson if she could show evidence of a cancer cluster or other health problems centered around that address. Ms. Pierson admitted she could not. The simple fact is that KPFB is a very low power non-commercial educational broadcast station which will generate only miniscule power densities in publicly accessible areas. No EIR is called for as far as radio frequency radiation issues are concerned.

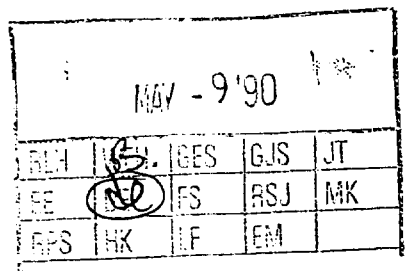
Sincerely,

Dane E. Ericksen

mk

cc: Mr. Steve Hawes
Dr. Raymond R. Neutra (BY FACSIMILE (415) 540-2064) @ 3:40 p.m.
John Crigler, Esq.
Mr. Donald E. Lincoln, Sutro Tower, Inc.

DEPARTMENT OF HEALTH SERVICES
2151 BERKELEY WAY
BERKELEY, CA 94704



May 7, 1990

Councilmember Anne Chandler
Berkeley City Council
2180 Milvia Street, 5th Floor
Berkeley, CA 94704

Dear Ms. Chandler:

At your request I have reviewed information provided to me by Mr. Dane Ericksen of Hammett & Edison, Consulting Engineers. KPFA has retained him to estimate exposures from the microwave repeater and the KPFB FM transmitter. After reviewing an earlier letter I asked that they provide more detailed information and they did this on April 24th.

The microwave studio to transmitter link would create electromagnetic fields well below levels thought to create physiological changes and well below all proposed standards.

The KPFB transmitter will be required to use a new more focused antennae which will have much less side irradiation than the present one. The pessimistic estimates of exposure to the neighborhood are far below present or proposed American standards and except for the roof of a building to the south will be below even the very stringent Russian standard of 2.4 microwatts per square centimeter. It should be noted that the Russian standard is based on some subtle physiological changes in experiments which have not been possible to replicate elsewhere. Mr. Ericksen says that exposure to the inhabitants will be lower because of shielding. There would be no regulatory basis for denying KPFA a building permit because of health concerns from the estimated exposures. You may wish to require that KPFB guarantee that these estimated levels will in fact be met and that they carry out measurements to prove this.

Sincerely,

Raymond R. Neutra, M.D., Dr.P.H.
Chief, Special Epidemiological
Studies Program

Enclosure

cc: D. Ericksen
C. Navarez
P. Scott

HAMMETT & EDISON, INC.

CONSULTING ENGINEERS
RADIO AND TELEVISION

ROBERT L. HAMMETT, P.E.
EDWARD EDISON, P.E.
ROBERT P. SMITH
DANE E. ERICKSEN, P.E.
HARRISON J. KLEIN, P.E.
WILLIAM F. HAMMETT, P.E.
GERALD E. SPILLMAN, P.E.
FREDERICK L. SPAULDING
LEONARD G. FILOMEO, P.E.
GERHARD J. STRAUB

MAILING ADDRESS:
BOX 280068
SAN FRANCISCO, CA 94128-0068

SHIPPING ADDRESS:
1400 ROLLINS ROAD
BURLINGAME, CA 94010-2304

OFFICE: 415-342-5200
202-396-5200
TELECOPIER: 415-342-8482

October 11, 1990

RLH	WFH	GES	GJS	JT
EE	DE	FS	RSJ	MK
RPS	HK	LF	EM	
File				

Mr. James H. Kemman
Electronics Research, Inc.
108 Market Street
Newburgh, Indiana 47630

Dear Jim:

I very much enjoyed our dinner Friday night at last week's SBE National Convention in St. Louis. Now I would like to discuss an antenna requirement for KPFB(FM), Channel 207A, 89.3 MHz, Berkeley, California, which ERI might be interested in bidding upon. The station is being re-located, after 37 years, to a new studio/transmitter site at 1929 Martin Luther King, Jr. Way in downtown Berkeley. While this new site is only 0.6 km northwest of the existing site, a complete, detailed application, addressing all current FCC requirements, is of course required. We have been retained by KPFB to prepare the engineering portion of that application.

The attached Figure 1 shows the directional antenna radiation limits. The main beam effective radiated power, at N 0° E, would be 460 Watts. In addition to meeting the pattern limits shown in Figure 1, the antenna must also comply with the FCC rule limiting the rate of change of the antenna pattern to 2 dB/10°. The Figure 1 pattern meets this requirement.

Because of local radiation hazard fears, KPFB had to agree to meet the 2.4 *micro*watt per square centimeter Russian exposure limit. For this reason, the new antenna must be horizontally polarized only and must limit its downward radiation. An elevation pattern which meets or surpasses the attached Figure 2 would insure compliance with this very low exposure limit.

At this time it is expected that the antenna will be mounted at the 65-foot level of a new 80-foot guyed tower. A Rohn Model 45G triangular, 18-inch face tower will most likely be used.

Your quotation should include a horizontal plane relative field pattern and an elevation pattern from 0° to 90° Mechanical details should also be provided.

Should you have any questions regarding this solicitation, please feel free to give me a call.

Sincerely,

Dane E. Ericksen

lr

Enclosures (2)

cc: Ms. Patricia Scott (w/o encls.)
Mr. Steve Hawes (w/ encls.)

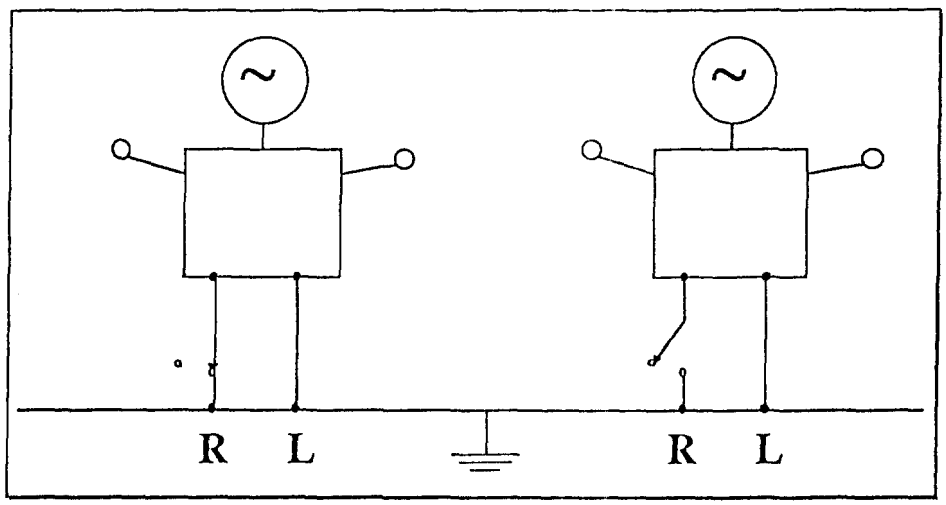
• Exhibit 3 •

Comments: ET Docket 93-62

January 21, 1994

HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

Bunny Hop



$k = R + L = 2L$ $\quad L = 0.5\,k$

$k' = R + L = L$ $\quad L = k'$

Overhead slide from presentation
at 1993 NAB Engineering Conference
"Meeting IEEE C95.1-1991 Requirements"

Bunny Hop

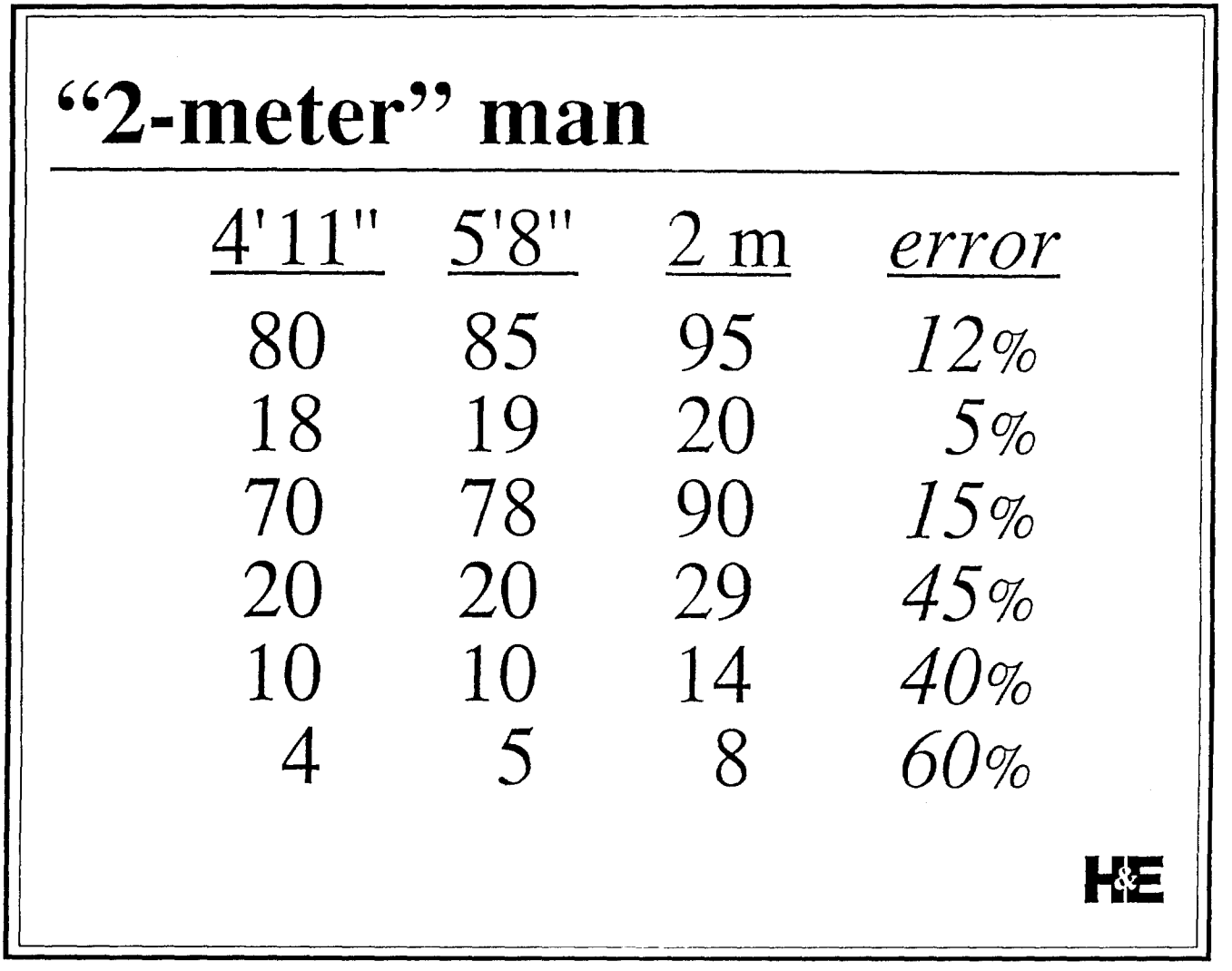
	2-foot	1-foot	ratio
ANSI 1992	1	1/2	0.50
tennis shoes	16	10	0.63
socks only	80	78	0.98
bare feet	90	90	1.00

Overhead slide from presentation
at 1993 NAB Engineering Conference
"Meeting IEEE C95.1-1991 Requirements"

Ground Interface

	shoe	sock	bare	strap
induced	1	29	37	42
contact	4	43	50	60

Overhead slide from presentation
at 1993 NAB Engineering Conference
"Meeting IEEE C95.1-1991 Requirements"



Overhead slide from presentation
at 1993 NAB Engineering Conference
"Meeting IEEE C95.1-1991 Requirements"